In the Claims

Please cancel Claims 21, 22, and 23 without prejudice.

Please amend Claims 1, 9, and 15.

LISTING OF CLAIMS

1. (currently amended) A method for forming a patterned silicon-containing structure to avoid notching along sidewalls of said structure, comprising:

providing a substrate;

providing a silicon layer on said substrate; said silicon layer comprises pre-doped polysilicone having a dopant gradient;

providing a hard mask layer on said silicon layer;

patterning and etching said hard mask layer;

partially etching through a first thickness of said silicon layer according to said hard mask layer without exposing the underlying substrate using a fluorine based etching chemistry; and,

then etching through a remaining thickness of said silicon layer to expose said underlying substrate according to said hard mask layer using an etchant gas devoid of fluorine.

2. (cancelled)

3. (previously presented) The method of claim 1 wherein said step of partially etching comprises a chamber pressure of from about 5 mTorr to about 80 mTorr; a source radio frequency power of from about 100 watts to about 1500 watts at a source radio frequency of 13.56 MHz; and a bias power of from about 100 watts to about 1500 watts.

4. (cancelled)

5. (previously presented) The method of claim 1 wherein said silicon layer comprises pre-doped polysilicon.

6. (previously presented) The method of claim 1 wherein said silicon layer comprises amorphous silicon.

7. (original) The method of claim 1 wherein said hard mask layer is a material selected from the group consisting of silicon oxide, silicon nitride and silicon oxynitride.

8. (previously presented) The method of claim 1 wherein said fluorine based etching chemistry comprises a gas selected from the group consisting of a fluorocarbon gas, a fluorine and nitrogen containing gas, and a fluorine and sulfur containing gas.

9. (currently amended) A method for forming a gate electrode to reduce or prevent necking at an upper portion of the gate electrode, comprising the steps of:

providing a substrate;

forming a gate oxide layer on the substrate;

providing a silicon layer comprises pre-doped polysilicon having a dopant gradient of high dopant concentration in a top layer portion to a low dopant concentration in a bottom layer portion of said polysilicon layer;

providing a hard mask layer on said silicon layer;

patterning and etching said hard mask layer;

subjecting said silicon layer to a first etch step using a fluorine based etching

chemistry to etch through a first thickness portion of said silicon layer without exposing the gate oxide layer, said fluorine based etching chemistry comprising a fluorine containing etchant gas selected from the group consisting of a fluorocarbon, a fluorine and nitrogen containing gas, and a fluorine and sulfur containing gas; and

then subjecting said silicon layer to a second etch step to etch through a remaining thickness portion of said silicon layer to expose said gate oxide layer using an etchant gas devoid of fluorine.

10. (cancelled)

11. (previously presented) The method of claim 9 wherein said etchant gas devoid of fluorine comprises chlorine, oxygen, and bromine.

12. (previously presented) The method of claim 9 wherein said silicon layer comprises pre-doped polysilicon.

13. (previously presented) The method of claim 9 wherein said silicon layer comprises amorphous silicon.

14. (previously presented) The method of claim 9 wherein said first etch step comprises a chamber pressure of from about 5 mTorr to about 80 mTorr; a source radio frequency power of from about 100 watts to about 1500 watts at a source radio frequency of 13.56 MHz; and a bias power of from about 100 watts to about 1500 watts.

15. (currently amended) A method for forming a gate electrode to reduce or prevent necking at an upper portion of the gate electrode, comprising the steps of:

providing a substrate comprising an uppermost gate oxide layer;

providing a silicon layer on said substrate, said silicon layer comprises pre-doped polysilicon having a dopant gradient of high dopant concentration in a top layer portion to a low dopant concentration in a bottom layer portion of said polysilicon layer;

providing a hard mask layer on said silicon layer;

providing a bottom anti-reflective coating layer on said hard mask layer;

providing a photoresist layer on said bottom anti-reflective coating layer;

patterning and etching said hard mask layer;

stripping said bottom anti-reflective coating layer and said photoresist layer from said hard mask layer; and

etching said silicon layer according to said hard mask layer in a first etch step without exposing said gate oxide layer using a fluorine based etching chemistry primarily consisting of a fluorine-containing etchant gas;

then etching said silicon layer in a second etch step to expose said gate oxide layer using a chlorine and bromine based etching chemistry to form a gate electrode.

16. (previously presented) The method of claim 15 wherein said fluorine-containing etchant gas comprises a gas selected from the group consisting of a fluorocarbon gas, a fluorine and nitrogen containing gas, and a fluorine and sulfur containing gas.

17. (cancelled)

18. (cancelled)

19. (previously presented) The method of claim 15 wherein said silicon layer comprises pre-doped polysilicon.

20. (previously presented) The method of claim 15 wherein said silicon layer comprises amorphous silicon.

21-23 (cancelled)

24. (previously presented) The method of claim 1 wherein said silicon layer comprises pre-doped polysilicon having a dopant gradient of high dopant concentration in a top layer portion to a low dopant concentration in a bottom layer portion of said polysilicon layer.

25. (previously presented) The method of claim 1 wherein said etchant gas devoid of fluorine comprises chlorine and bromine.

26. (previously presented) The method of claim 1 wherein said fluorine based etching chemistry consists primarily of a fluorine-containing etchant gas.

27. (previously presented) The method of claim 9 wherein said fluorine based etching chemistry consists primarily of a fluorine-containing etchant gas.